

What is claimed:

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1. A method of making an adhesive or coating, comprising:
reacting at least one difunctional alcohol and at least one dicarboxylic acid to form a copolyester polymer chain, and
during the course of that reaction, infusing at least one low polarity polymeric block into the copolyester polymer chain.
 2. The method of claim 1, wherein the reaction is carried out in two stages, the first stage being a direct esterification or transesterification reaction, and the second stage being a polyesterification stage, and
wherein the low polarity polymeric block is infused during the first stage
 3. The method of claim 2 further comprising adding at least one catalyst during the first stage.
 4. The method of claim 3, whereby the at least one catalyst is an esterification catalyst selected from the group of: acid salts, hydroxides of potassium and lithium, *para*-toluenesulfonic acid (*p*-TSA), lead and tin salts, mineral acids and blends thereof.
 5. The method of claim 3, whereby the at least one catalyst is a transesterification catalyst selected from the group of: alkyl titanates, alkyl tin compounds, acetates of antimony, zinc, manganese, magnesium, calcium and blends thereof.
 6. The method of claim 2 further comprising adding at least one catalyst during the second stage.
 7. The method of claim 6, whereby the at least one catalyst is selected from the group of: oxides of lead, oxides of manganese, oxides of germanium, alkyl titanates, alkanolamine complexes of titanium, organotin compounds and blends thereof.

8. The method of claim 1, whereby the adhesive or coating has substantial adhesion to polymeric or cellulosic substrates.

9. The method of claim 8, whereby the substantial adhesion is initial adhesion.

10. The method of claim 9, whereby the substantial adhesion is initial adhesion to low surface energy substrates.

11. The method of claim 8, whereby the substantial adhesion is aged adhesion.

12. The method of claim 11, whereby the substantial adhesion is aged adhesion to low surface energy substrates.

✓ 13. The method of claim 1, wherein the adhesive or coating is solvent based.

14. The method of claim 1, wherein the adhesive or coating is applied as a hot-melt.

15. The method of claim 14, wherein the adhesive is a web.

16. The method of claim 14, wherein the adhesive or coating is a film.

17. The method of claim 1, wherein the at least one difunctional alcohol is selected from the group of: alkyl diols from C₂ to C₁₂, cycloaliphatic diols, aliphatic diols containing aromatic moieties, C₂ - C₁₂ polyalkyleneoxide polyols, and blends thereof.

18. The method of claim 17, wherein the at least one difunctional alcohol is selected from the group of: ethylene glycol, diethylene glycol, butanediol, propanediol, hexane diol, cyclohexanedimethanol, oligomeric alkyleneoxide polyols with a number average molecular weight from about 300 to about 5000, and blends thereof.

✓ 19. The method of claim 18, wherein the at least one difunctional alcohol is selected from the group of: ethylene glycol, butanediol, and blends thereof.

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20. The method of claim 1, wherein the at least one dicarboxylic acid is selected from the group of: aliphatic diacids from C₄ to C₃₆, cycloaliphatic diacids, aromatic diacids, their C₁ to C₆ alkyl esters of dicarboxylic acids, and blends thereof.

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21. The method of claim 20, wherein the at least one dicarboxylic acid is selected from the group of: aliphatic diacids from C₄ to C₃₆ such as adipic acid, azelaic acid, sebacic acid, cyclohexane dicarboxylic acid, or aromatic diacids such as terephthalic acid, naphthalene dicarboxylic acid, isophthalic acid, the lower (C₁ to C₆) alkyl esters of said dicarboxylic acids, and blends thereof.

✓ 22. The method of claim 21, wherein the at least one dicarboxylic acid is selected from the group of: terephthalic acid, sebacic acid, isophthalic acid or their methyl esters, or blends thereof.

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23. The method of claim 1, wherein the at least one low polarity polymeric block is selected from the group of: saturated and unsaturated telechelic polyolefins, fluorine substituted telechelic oligomers and polymers, functionally terminated ABA block copolymers of polyalkyleneoxide (A) and alkyl and aromatic substituted polysiloxanes (B), and blends thereof.

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24. The method of claim 23, wherein the at least one low polarity polymeric block is a saturated and/or unsaturated polyolefin with a weight average molecular weight from about 500 to about 4500, whose constituent components are selected from the group consisting of C₂ to C₁₈.

25. The method of claim 24, wherein the at least one low polarity polymeric block has a weight average molecular weight from about 1000 to about 4000.

26. The method of claim 25, wherein the at least one low polarity polymeric block has a weight average molecular weight from about 1800 to about 3500.

✓ 27. The method of claim 23, wherein the at least one low polarity polymeric block is selected from: ABA telechelic block copolymers of polyalkyleneoxide (A) and alkyl and

aromatic substituted polysiloxanes (B) with a weight average molecular weight from about 1000 to about 10,000.

28. The adhesive or coating composition of claim 27, wherein the at least one low polarity polymeric block is selected from: ABA telechelic block copolymers with a weight average molecular weight from about 1500 to about 6000.

29. The method of claim 28, wherein the at least one low polarity polymeric block is selected from: ABA telechelic block copolymers with a weight average molecular weight from about 1800 to about 3500.

30. The method of claim 23, wherein the at least one low polarity polymeric block is selected from fluorine substituted telechelic oligomers and polymers of polyesters, acrylics, polyurethanes, polyolefins, polycarbonates, epoxies, and blends thereof.

31. The method of claim 1, wherein the at least one low polarity polymeric block is a hydroxyl terminated butylene/ethylene copolymer.

32. The method of claim 31, wherein the at least one low polarity polymeric block comprises about 50% by weight of butylene and about 50% by weight of ethylene.

33. The method of claim 31, wherein the at least one low polarity polymeric block comprises about 85% by weight of butylene and about 15% by weight of ethylene.

✓ 34. The method of claim 1, wherein the at least one low polarity polymeric block is an ABA block polymer consisting of about 40 wt% polyalkyleneoxide and about 60 wt% polydimethylsiloxane.

35. The method of claim 1 further comprising adding at least one polyfunctional branching agent during the first stage.

36. The method of claim 35, wherein the at least one polyfunctional branching agent is selected from the group of: trimellitic anhydride, pyromellitic dianhydride, trimethylolethane, trimethylolpropane, pentaerythritol and blends thereof.

37. A method of improving the adhesion of copolyesters to polymeric or cellulosic substrates, comprising:

sub C17 incorporating a low polarity telechelic oligomeric block segment in the copolyester polymer chain.

38. The method of claim 37, wherein the improved adhesion is initial adhesion.

39. The method of claim 38, wherein the improved adhesion is initial adhesion to low surface energy substrates.

40. The method of claim 37, wherein the improved adhesion is aged adhesion.

41. The method of claim 40, wherein the improved adhesion is aged adhesion to low surface energy substrate.

42. The method of claim 37, wherein the copolyester is a crystalline copolyester.

43. The method of claim 37, wherein the low polarity telechelic oligomeric block segment is selected from the group of: saturated and unsaturated polyolefins, polysiloxanes, and fluorine substituted polyesters, acrylics, polyurethanes, polycarbonates, epoxies, and blends thereof.

44. The method of claim 43, wherein the low polarity block is a polyolefin, polysiloxane, or blend thereof.

45. The method of claim 37, wherein the low polarity block segment is incorporated into the copolyester polymer chain at levels of from about 0.5 to about 85 weight percent.

46. The method of claim 45, wherein the low polarity block segment is incorporated into the copolyester polymer chain at levels of from about 1 to about 50 weight percent.

47. The method of claim 46, wherein the low polarity block segment is incorporated into the copolyester polymer chain at levels of from about 2 to about 35 weight percent.

48. A method of improving the adhesiveness of a polymeric material, comprising adding to the polymeric material an adhesion promoter, the adhesion promoter comprising a copolyester containing a low polarity telechelic oligomeric block segment.

49. The method of claim 48, wherein the polymeric material is a crystalline polymer.

50. An adhesive or coating copolyester composition having substantial adhesion to polymeric substrates, comprising the reaction product of:

at least one difunctional alcohol;

at least one dicarboxylic acid; and

at least one low polarity telechelic oligomeric block material.

51. The adhesive or coating composition of claim 50, wherein the composition has substantial retained adhesion to polymeric and low surface energy substrates.

52. The adhesive or coating composition of claim 50, wherein the at least one difunctional alcohol is selected from the group of: alkyl diols from C₂ to C₁₂, cycloaliphatic diols, aliphatic diols containing aromatic moieties, C₂ - C₁₂ polyalkyleneoxide polyols, and blends thereof.

53. The adhesive or coating composition of claim 50, wherein the at least one dicarboxylic acid is selected from the group of: aliphatic diacids from C₄ to C₃₆, cycloaliphatic diacids, aromatic diacids, and blends thereof.

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54. The adhesive or coating composition of claim 50 further comprising at least one polyfunctional branching agent.

55. The adhesive or coating composition of claim 50, wherein the at least one low polarity block is selected from the group of: saturated and unsaturated telechelic polyolefins; fluorine substituted telechelic oligomers and polymers; functionally terminated ABA block copolymers of (A) polyalkyleneoxide and (B) alkyl or aromatic substituted polysiloxanes; and blends thereof.

56. The adhesive or coating composition of claim 55, wherein the at least one low polarity block is a polyolefin.

57. The adhesive or coating composition of claim 50, wherein the at least one low polarity block comprises about 50% by weight of butylene and about 50% by weight of ethylene.

58. The adhesive or coating composition of claim 50, wherein the at least one low polarity polymeric block comprises about 85% by weight of butylene and about 15% by weight of ethylene.

✓ 59. The adhesive or coating composition of claim 50, wherein the at least one low polarity polymeric block is an ABA block polymer consisting of about 40 wt% polyalkyleneoxide and about 60 wt% polydimethylsiloxane.

60. The method of claim 1, wherein the adhesive or coating has a weight average molecular weight of about 5,000 to about 150,000.

61. The method of claim 1, wherein the adhesive or coating has a weight average molecular weight of about 30,000 to about 90,000.

62. The adhesive or coating composition of claim 50, wherein the adhesive or coating composition has a weight average molecular weight of about 5,000 to about 150,000.